

REMARKS/ARGUMENTS

Claims 1-35 and 37-48 are pending in the application. Claims 1-35 and 37-48 are rejected. Claim 36 was previously cancelled. Claims 1, 3-5, 40, 44 and 48 have been amended. Claims 49-53 have been added. No new matter has been added. In view of the foregoing amendments and the following remarks, Applicants respectfully request allowance of Claims 1-35 and 37-53.

CLAIM REJECTIONS – 35 USC § 103

Claims 1, 9-11, 23-26, 40 and 44 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Tajime, US Pat. No. 6,915,018 in view of Noh et al., (hereinafter "Noh"), US Pat. No. 7,079,581, further in view of Chiang et al., (hereinafter "Chiang"), "A New Rate Control Scheme Using Quadratic Rate Distortion Model", IEEE, 1996, pgs. 73-76. Claims 1, 9-11, 23-26, 40, 44 and 48 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Tajime in view of Chiang. Claims 2, 8, 27 and 33 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Tajime in view of Noh, in view of Chiang and further in view of Kim, US Pat. No. 5,777,812. Claims 3, 28, 41 and 43 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Tajime, in view of Noh, in view of Chiang, in view of Kim and further in view of Simpson et al., (hereinafter "Simpson"), US Pat. No. 6,724,817. Claims 4-5, 29-30, 42-43 and 46-47 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Tajime, in view of Noh, in view of Chiang, in view of Kim and further in view of Sugiyama, US Pat. No. 6,940,911. Claims 6-7, 31 and 32 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Tajime in view of Noh, in view of Chiang, in view of Kim and further in view of Tsuru, US Pat. No. 6,950,040. Claims 12-15 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Tajime. Claim 17 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Tajime, in view of Hui, in view of Kim and further in view of Simpson. Claims 18 and 19 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Tajime, in view of Hui, in view of Kim, and further in view of Sugiyama. Claims 20 and 21 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Tajime, in view of Hui, in view of Kim, and further in view of Tsuru. Claims 34, 38 and 39 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Hui, in view of Sugiyama and further in view of Simpson. Claim 35 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Hui, in view of Sugiyama and further in view of Simpson. Claim 37 is

rejected under 35 U.S.C. § 103(a) as being unpatentable over Hui, in view of Sugiyama, and further in view of Tsuru.

CLAIMS 1-11, 15, 19, 26, 30 AND 40-48 DEFINE OVER THE PRIOR ART

The combination of Tajime, Noh and Chiang does not teach or suggest at least the below-highlighted elements of the rate and quality control system recited in representative claim 1, and independent claims 40, 44 and 48, which recite similar subject matter. Currently amended independent claim 1 recites in part:

a first quantizer estimator to generate a first quantizer estimate for each picture based on the complexity indicators, **a target coding rate calculated for each picture** and a transmit buffer fullness indicator representing a quantity of stored previously-coded video data;

a second quantizer estimator, to generate a second quantizer estimate for each picture, the second quantizer estimates for I and P pictures based on a linear regression analysis of quantizers and coding rates of previously-coded pictures;

a quantizer selector to generate a quantizer parameter for each picture from the first and second quantizer estimates; and

a coding policy unit operative according to a rate control policy, wherein the rate control policy is selected based at least on a comparison of the first and second quantizer estimates.

Tajime does not disclose a first quantizer estimator to generate a first quantizer estimate for each picture based on the complexity indicators, **a target coding rate calculated for each picture** and a transmit buffer fullness indicator representing a quantity of stored previously-coded video data. Tajime's "target average bitrate" is "supplied from outside" and there is no teaching or suggestion that it is calculated for **each** picture as is claimed. (Tajime, 9:26). Indeed, the fact that it is a "target **average** bitrate" implies that a bitrate is not calculated for **each** picture.

Claim 1 goes further and requires **two** quantizer **estimates**: "...generate a quantizer parameter for each picture **from the first and second quantizer estimates**." Tajime has no disclosure corresponding to this element. While Tajime discloses generating a quantizer value (i.e., "base quantizer step size" computed by complexity measure computing means 101), he fails to disclose generation of a second quantizer **estimate**; Tajime simply "[adjusts] the base

quantizer step size" via quantizer step size adjusting means 103. (Tajime, 8:19-37). Tajime states:

In the quantizer step size selector 104, if the quantizer step size Q_m supplied from the quantizer step size adjusting means 103 is smaller than the *input bit stream quantizer step size Q_j supplied from the de-encoding path* section 11, the input bit stream quantizer step size Q_j is supplied to the encoding path section 13.

(Tajime, 10:16-21; emphasis Applicants'). Clearly the "input stream quantizer step size supplied from the *de-encoding path*" is not a *quantizer estimate* as is claimed, but rather is the *actual quantizer value used* during a previous encode of the video stream that currently is being re-encoded. (Tajime, 7:37-44).

Finally, the cited art does not teach or suggest a coding policy unit operative according to a rate control policy, wherein the rate control policy is selected based at least on a comparison of the first and second quantizer estimates. Applicants have read the cited passage (i.e., 11:51-12:15), but fail to see any teaching or suggestion that a rate control policy is selected based at least on the comparison of two quantizer estimates. From what Applicants can surmise, Tajime simply defines a maximum quantizer step size "so that the specified maximum bit rate is not exceeded..." (Tajime, 11:54-57). In any event, and as discussed above, the input bit stream quantizer step size is not a quantizer *estimate* for the picture, but rather is an *actual quantizer value used* during a previous encode of the video stream that currently is being re-encoded. (Tajime, 7:37-44).

Because the combination of Tajime, Noh and Chiang does not teach or suggest the above limitations, the combination does not render representative claim 1 obvious under § 103. Accordingly, Applicants believe that the rejections of independent claims 1 and 40 should be reconsidered and withdrawn. Claims 2-11 depend from independent claim 1 and are allowable for at least the reasons applicable to claim 1, as well as due to the features recited therein. Claims 41-43 depend from independent claim 40 and are allowable for at least the reasons applicable to claim 40 as well as due to the features recited therein. Applicants believe also that independent claims 44 and 48 are allowable for at least the reasons applicable to claim 1, as well as due to the features recited therein. Claims 45-47 depend from independent claim 44 and are allowable for at least the reasons applicable to claim 44, as well as due to the features recited therein.

Also, at least dependent claim 5, and dependent claims 19, 30 and 43, which recite certain subject matter similar to claim 5, define over the prior art. Representative dependent claim 5 recites in part:

a coding policy unit, to determine when it becomes necessary to eliminate motion vectors according to a rate control policy, and

wherein the AVC coder includes a prediction circuit that generates motion vectors for prediction of video data of macroblocks in the input pictures and of video data for sub-blocks therein of various sizes, the prediction circuit responsive to control from the coding policy unit, to **eliminate selected motion vectors from an output coded bitstream.**

The combination of Tajime, Noh, Chiang, Kim, Sugiyama, and Simpson does not teach or suggest at least the above-highlighted elements of representative claim 5. In particular, the combination does not teach at least a coding policy unit, to determine when it becomes necessary to eliminate motion vectors according to a rate control policy. The Examiner cites various passages from Simpson as teaching this element, however Simpson is directed to adaptive *Image* – not *video* – data compression, and consequently makes no mention of *motion* in any respect.

The Examiner cites Sugiyama as teaching the prediction circuit responsive to control from the coding policy unit, to eliminate selected motion vectors from an output coded bitstream. Applicants respectfully disagree. While Sugiyama may teach eliminating *frames*, he does not teach eliminating *motion vectors*.

For at least these reasons, Applicants believe that the rejections of claims 5, 19, 30 and 43 should be reconsidered and withdrawn.

Finally, new dependent claim 49, and new dependent claims 50-53, which recite certain subject matter similar to claim 49, define over the prior art. Representative dependent claim 49 recites that, for P and B pictures, the target coding rate is a predetermined target coding rate if a scene change detection signal indicates a scene change, support for which can be found in the specification at least at para. 110. This element is neither taught nor suggested by the prior art. Tajime fails to mention scene change detection at all. While Noh discusses scene change detection, he simply “determin[es] if a scene change is detected [and] convert[s] the picture type from P type to I type and grouping frames into GOP [...] when it is determined in step (d) that a scene change is detected.” (Noh, 2:19-25).

For at least these reasons, Applicants believe that claims 49-53 are patentable.

CLAIMS 12-22 DEFINE OVER THE PRIOR ART

Currently amended independent claim 12 recites in part:

a target bits computer, responsive to the complexity indicators and to a picture type signal, to calculate a target coding rate for each picture in the video sequence,

[...]

an activity based quantizer computer to calculate activity of each picture in the video sequence and modify the buffer-based quantizer estimate in response thereto,

Tajime does not teach or suggest at least the above-highlighted elements of the rate and quality control system recited in claim 12. Applicants have reviewed the passages cited by the Examiner with respect to the target bits computer (i.e., 12:1-16 and 13:48-58), but could find nothing that teaches or suggests a **target bits computer** that is responsive to **complexity indicators** and a **picture-type signal**. True, Tajime says that an “addition value is held for each picture encoding prediction method,” but the value is supplied to the “addition value computing means 1302,” which performs “quantizer step size computation”; it does not calculate a **target coding rate** for each picture. (Tajime, 13:48-67). Further, Applicants can find no teaching or suggestion in the Tajime passages cited by the Examiner (i.e., 11:51-12:16 and 9:43-61) of an activity based quantizer computer to calculate the **activity of each picture** and **modify** the buffer-based quantizer estimate in response thereto.

For at least these reasons, Applicants believe that the rejection of claim 12 should be reconsidered and withdrawn. Claims 13-22 depend from independent claim 12 and are allowable for at least the reasons applicable to claim 12, as well as due to the features recited therein.

CLAIMS 23-33 DEFINE OVER THE PRIOR ART

Independent claim 23 recites in part:

a rate model quantizer estimator, responsive to quantizers and coding rates of previously-coded pictures and to picture type indicators of input pictures, to estimate quantizer parameters of the input pictures according to a linear regression analysis, **wherein linear regression coefficients of input I pictures are selected according to the complexity indicators for such I pictures**,

The combination of Tajime, Noh and Chiang does not teach or suggest at least the above-highlighted elements of the rate and quality control system recited in claim 23. As teaching

wherein linear regression coefficients of input I pictures are selected according to the complexity indicators for such I pictures, the Examiner cites to both Tajime and Chiang and asserts that "coefficients represent a change in the pixel which is selective reduces the bit rate [sic]." (Office Action dated 6/10/2009, para. 10). Applicants respectfully disagree, but admittedly fail wholly to understand exactly the relationship the Examiner is attempting to articulate. In any event, nowhere does Tajime or Chiang disclose selecting **linear regression coefficients** of input I pictures **according to complexity indicators**.

For at least these reasons, Applicants believe that the rejection of claim 23 should be reconsidered and withdrawn. Claims 24-33 depend from independent claim 23 and are allowable for at least the reasons applicable to claim 23, as well as due to the features recited therein.

CLAIMS 34-35 AND 37-39 DEFINE OVER THE PRIOR ART

Independent claim 34 recites in part:

a rate controller having an input coupled to a source of video data and generating a quantizer selection on a picture-by-picture basis
[...]
wherein the video coding chain deletes motion vectors under control of the rate controller.

The combination of Hui, Sugiyama, and Simpson does not teach or suggest at least the above-highlighted elements of the video coding system recited in independent claim 34. In particular, the combination does not teach wherein the video coding chain deletes **motion vectors** under control of the rate controller. Claim 34 recites certain subject matter similar to claims 5, 19, 30, and 43, and Applicants direct the Examiner to the above arguments (page 18) regarding those claims. In the Examiner's response to Applicants' previous arguments (Office Action dated 6/10/2009, para. 2), the Examiner insists that Simpson and Sugiyama disclose the above-highlighted elements, even though, as discussed above in conjunction with claim 5, Simpson is directed to adaptive *image* – not *video* – data compression (and consequently makes no mention of **motion** in any respect), and while Sugiyama may teach eliminating **frames**, he does not teach eliminating **motion vectors**.

Furthermore, Hui is not concerned with quantizer estimates and parameters for **pictures**, but rather for **macroblocks (MB)** of pictures, as shown by, for example: "A rate

controller 215 determines a reference quantization step size (QS_{ref}) for each MB..." (Hui, 9:19-20).

For at least these reasons, Applicants believe that the rejection of claim 34 should be reconsidered and withdrawn. Claims 35 and 37-39 depend from independent claim 34 and are allowable for at least the reasons applicable to claim 34, as well as due to the features recited therein.

In view of the above amendments and arguments, it is believed that the above-identified application is in condition for allowance, and notice to that effect is respectfully requested. Should the Examiner have any questions, the Examiner is encouraged to contact the undersigned at (408) 975-7963.

The Commissioner is authorized to charge any fees or credit any overpayments which may be incurred in connection with this paper under 37 C.F.R. §§ 1.16 or 1.17 to Deposit Account No. **11-0600**.

Respectfully submitted,

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